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None

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(54) A process for producing meat pies

(57) Prepared raw meat and other ingredients are mixed and cooked in cooking vessel (12) to form a pie filling mixture. The cooked mixture is delivered into containers, which are half filled with the mixture first and then are topped up with mixture. The containers are rapidly cooled to approximately 5°C. Each container can be delivered to a pie forming station (20). A pie base dough is prepared by mixing ingredients and scrap dough and formed into dough buns. Each dough bun is placed in a pie tray at station (20) and pressed by a former to form a pie base. Pie filling mixture is deposited in each pie base. Cover dough for the pies is formed from a layered dough sheet. Each pie cover is perforated before placing over a filled pie base. Unwanted material is removed from the pies by air jet and they are sprayed with a glazing liquid.

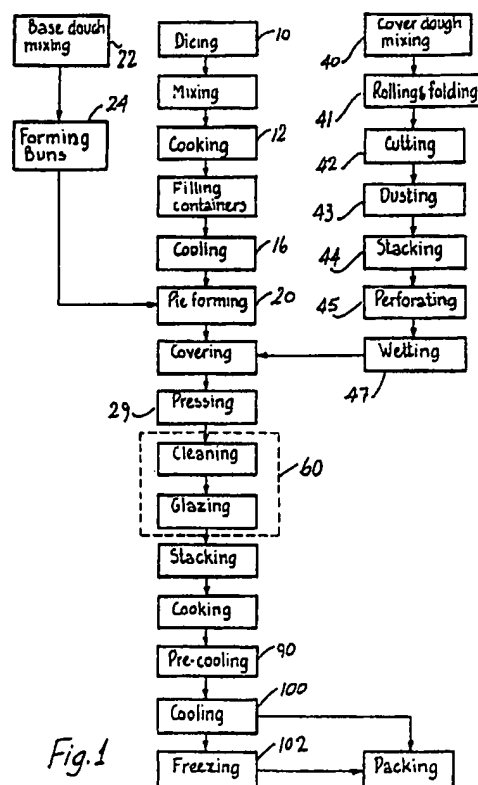
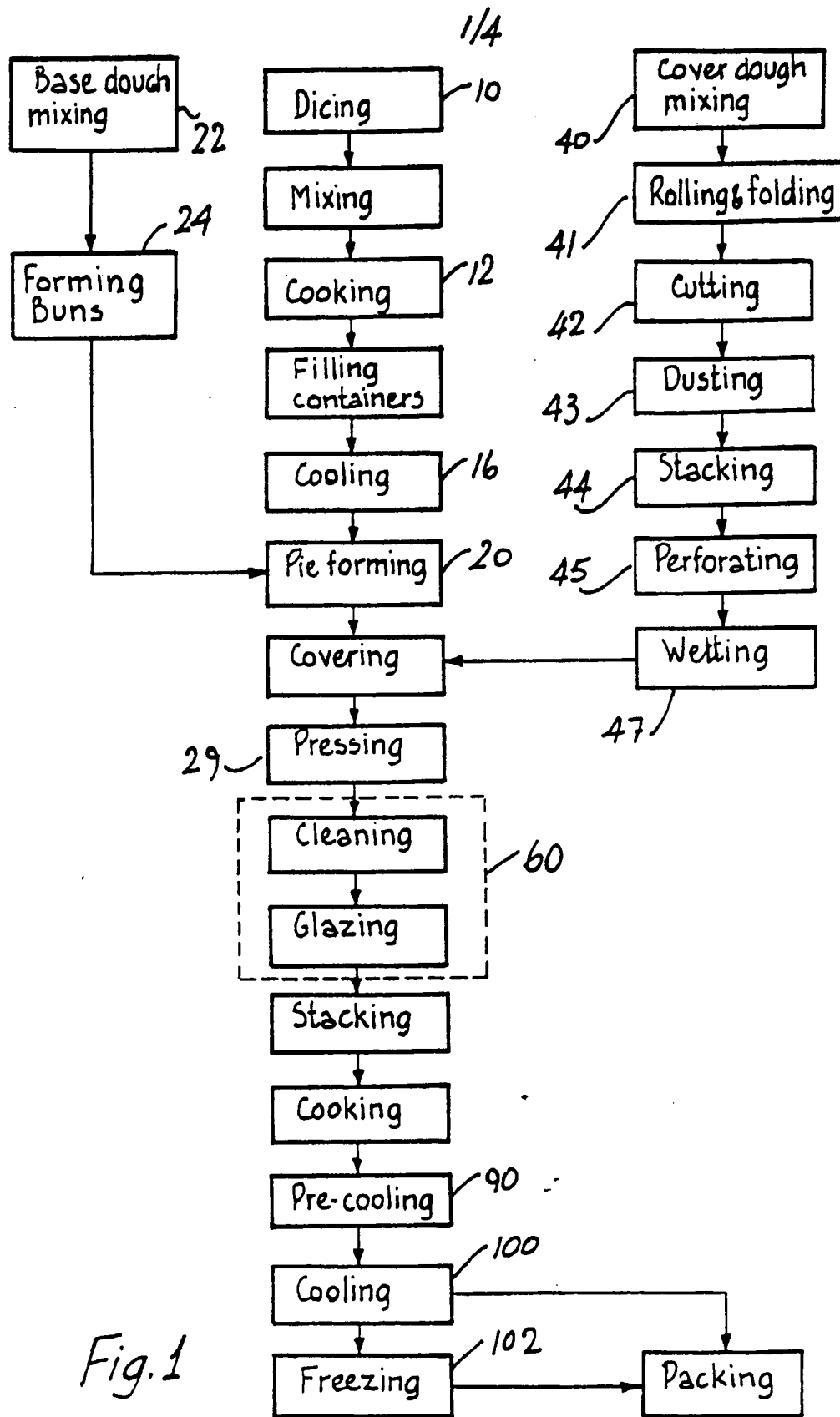
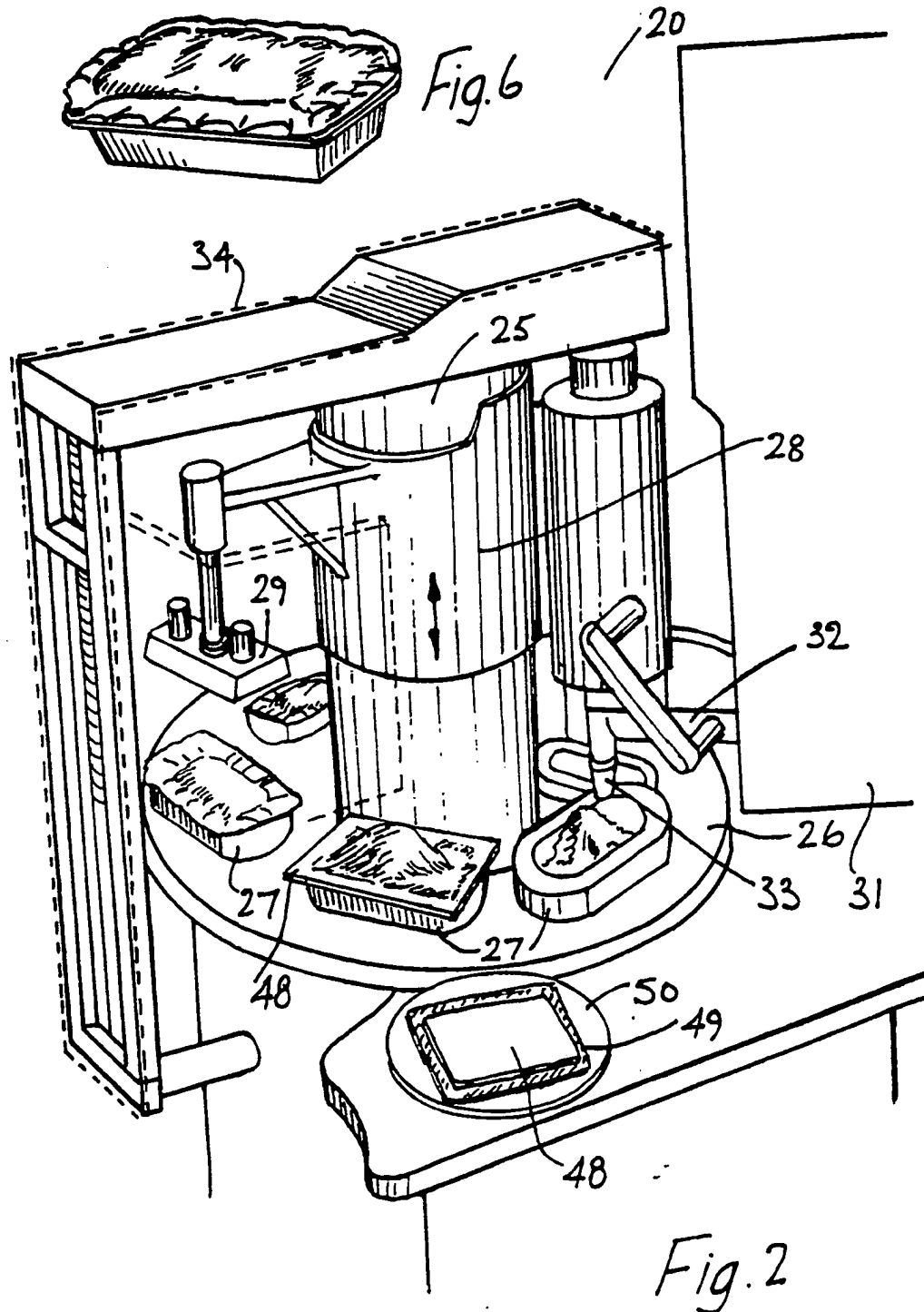


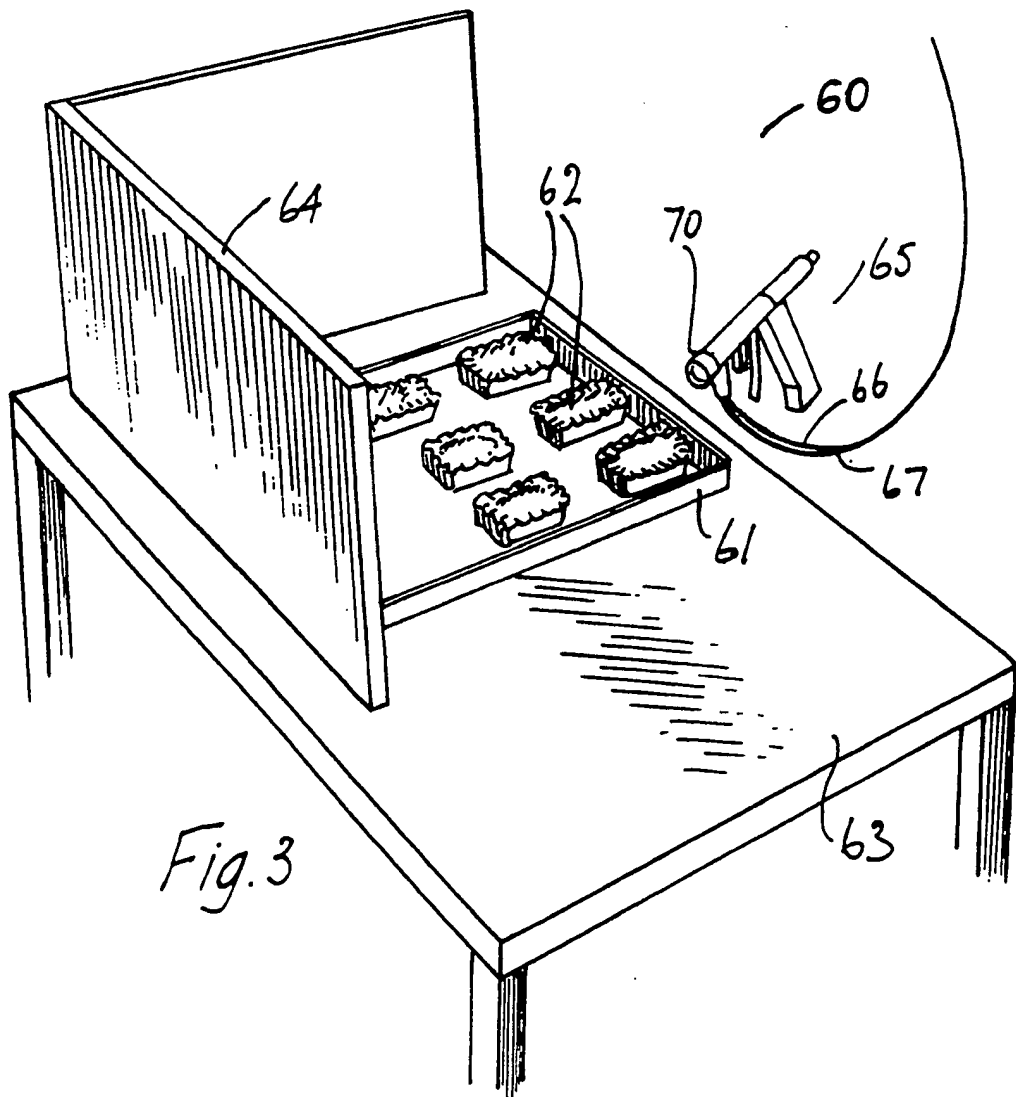
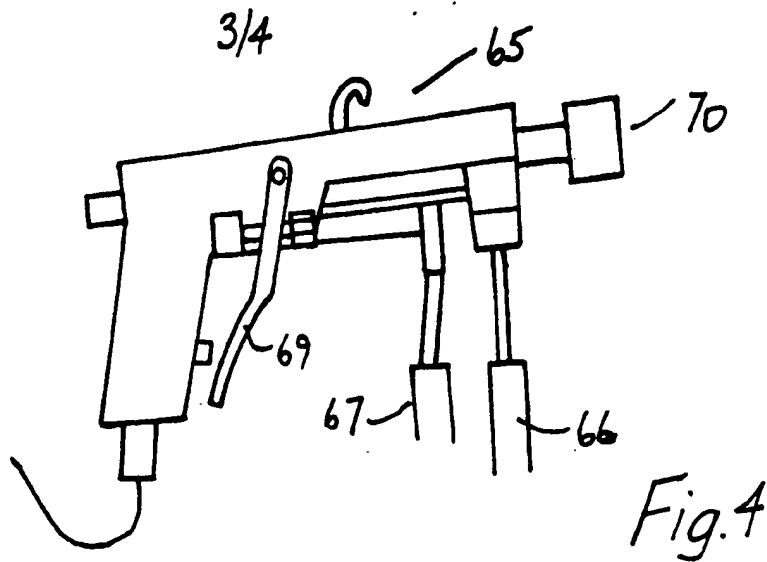
Fig.1

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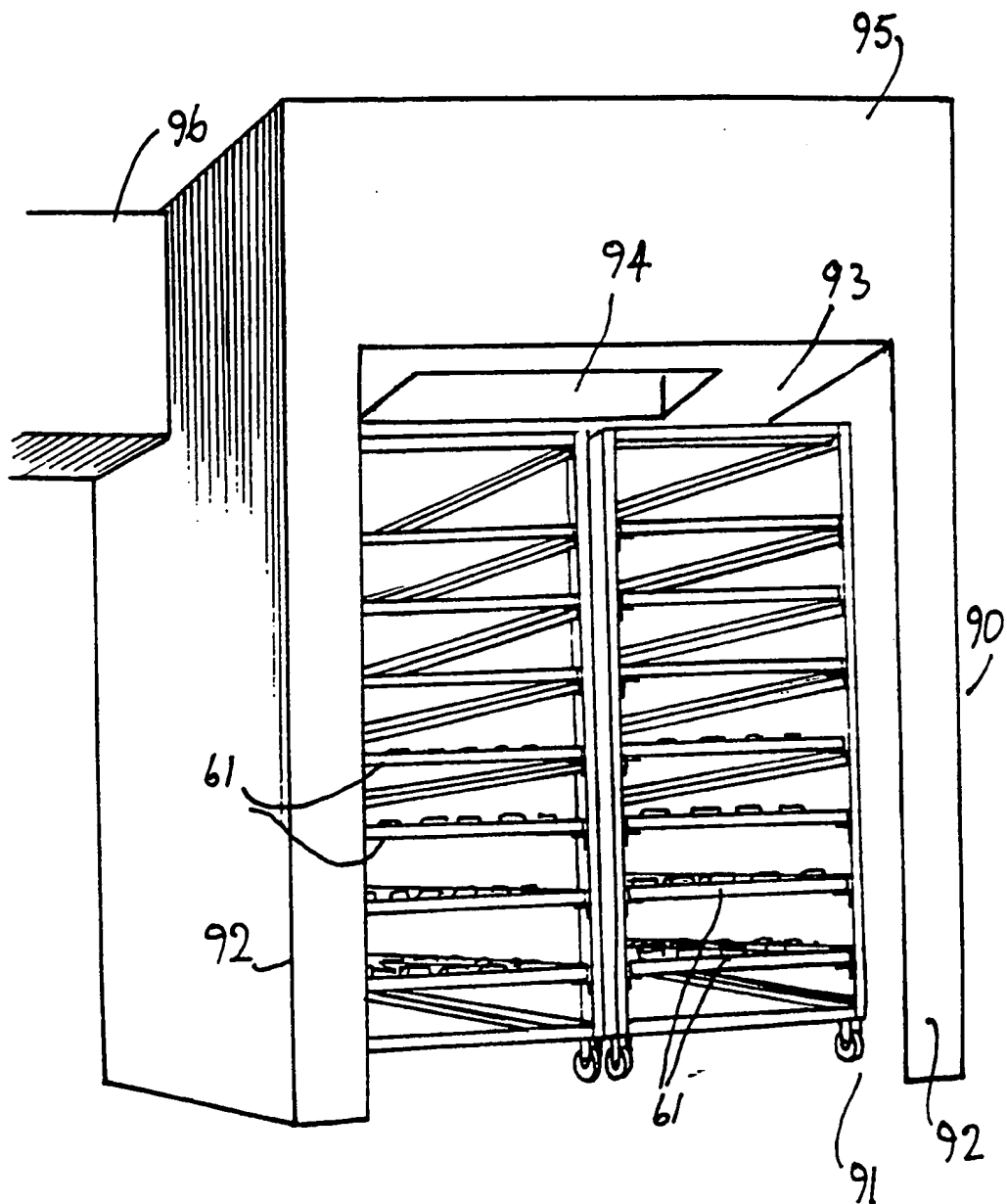


Fig. 5

"A Process for Producing Meat Pies"

This invention relates to a process for producing meat pies.

According to the invention there is provided a process for producing meat pies comprising the steps:

- 5           cutting up raw meat and dicing the raw meat to form meat pieces of a pre-desired size;
- delivering the diced meat pieces to a cooking vessel together with other ingredient materials;
- mixing the ingredient materials to form a pie filling mixture and cooking the pie filling mixture for a pre-set period;
- 10           pouring the cooked filling mixture into a number of containers and closing the containers;
- rapidly cooling the pie filling mixture within each container to a pre-set desirable temperature;
- 15           delivering cooled pie filling material to a pie filling station;
- preparing a pie base dough by mixing selected quantities of ingredient materials and adding a pre-set amount of scrap dough to the mixture;
- 20           forming the base dough into dough buns of a pre-desired size;
- depositing each dough bun in a pie tray;

placing each pie tray on an associated support shaped to receive and engage an underside of the pie tray;

5 pressing an associated former into the dough to spread the dough in the pie tray such that it forms a pie base covering an inside wall of the pie tray;

removing the former and conveying the pie tray to the pie filling station;

10 depositing a measured quantity of pie filling material into the pie base at the pie filling station;

preparing a cover dough by mixing selected quantities of ingredient materials;

15 rolling the dough and folding the dough over on itself a pre-set number of times between rolling operations to form a layered dough sheet of a predesired thickness;

cutting the dough sheet into shaped pie covers;

dusting a top surface of each pie cover with flour;

perforating each pie cover;

20 wetting a bottom surface of each pie cover with warm water;

placing the pie cover over the filled pie base downstream of the pie filling station;

25 pressing the pie cover against the pie base around a rim of the pie tray to form an uncooked meat pie

having a sealed pie casing enclosing the pie filling,  
mounted within a pie tray;

mounting a number of the uncooked meat pies on a  
tray;

5       cleaning the covers of the pies with an air jet to  
remove excess flour and pieces of scrap dough; and

spraying a top surface of the pie cover with a  
glazing liquid.

10       In a preferred embodiment of the invention the pie filling  
mixture is poured from an outlet of the cooking vessel  
into the containers by partially filling each container  
with pie filling mixture and then pouring more filling  
mixture into each container to fill each container.

15       In another embodiment the dough sheet for the pie covers  
is prepared by:

passing the dough through dough rollers a number of  
times for progressively rolling the dough into a thin  
elongate sheet;

20       folding one end of the dough sheet inwardly over the  
dough sheet and then folding the other end of the  
dough sheet inwardly over the first fold to form  
three superimposed dough layers;

25       turning the dough through 90° and passing the dough  
through the dough rollers to progressively roll the  
dough into a thin elongate sheet;

repeating the folding, turning and rolling operations  
twice more to form the layered dough sheet.



In a further embodiment the scrap dough is added to the pie base dough mixture in an amount of between 8% and 12% by weight.

5 Preferably, the pie covers are perforated by stacking a number of the pie covers and then driving a spike centrally through the stack of pie covers.

10 In another embodiment a bottom surface of each pie cover is wetted by placing a pie cover on a damp sponge, the sponge sitting in a warm water bath with a base of the sponge sitting in warm water and a top surface of the sponge projecting above the water.

In a further embodiment the process includes the further steps:

15 stacking a number of trays of glazed uncooked meat pies spaced-apart on associated trolleys;

delivering each trolley to an oven and cooking the meat pies for a pre-set time at a selected temperature;

removing the trolleys from the oven;

20 delivering each trolley into a cooling booth having a housing open at one side for reception of the trolleys, the booth having an associated extractor fan mounted externally of the booth to draw ambient air in through the opening and through the booth and  
25 out through an air outlet of the booth spaced apart from the opening to cool the pies to a pre-desired temperature;

removing the pies from the cooling booth and delivering the pies to a chiller;

cooling the pies in the chiller to approximately 1 to 3°C.

5 In another embodiment the pie trays are colour coded to correspond to the type of filling in each pie.

The invention will be more clearly understood from the following description of some embodiments thereof, given by way of example only, with reference to the accompanying  
10 drawings, in which:

Fig. 1 is a flow chart illustrating a process for producing meat pies according to the invention;

Fig. 2 is a perspective view of a pie forming apparatus used in the process;

15 Fig. 3 is a perspective view of spraying apparatus for cleaning and glazing pies according to the process;

Fig. 4 is an elevational view of a spray gun used in the spraying apparatus;

20 Fig. 5 is a perspective view of a cooling booth used in the process; and

Fig. 6 is a perspective view of a meat pie formed by the process.

Referring to the drawings, a process and apparatus for  
25 producing meat pies will be described.

Raw meat is cut up and then diced in a dicing machine 10 to form meat pieces of a pre-desired size. The meat pieces are delivered to a cooking vessel 12 together with other ingredient materials and are mixed with the other  
5 ingredient materials within the cooking vessel 12 to form a pie filling mixture which is then cooked within the cooking vessel 12. When cooked the pie filling mixture is poured from an outlet of the cooking vessel into a number of containers. This step is carried in two stages. All  
10 the containers are initially half filled with pie filling mixture and then the containers are topped up with further pie filling mixture from the cooking vessel 12. In this way, advantageously, an even distribution of liquid and solid material of the pie filling mixture is delivered to  
15 each of the containers as the heavier solid materials in the pie filling mixture tend to collect at the bottom of the cooking vessel and thus be discharged first.

When the containers are filled, they are closed with a lid and the closed containers are mounted on racks in a  
20 cooling room 16. The containers are rapidly cooled to a temperature of approximately 5°C within the cooling room 16. To facilitate cooling, the containers are mounted on a number of vertically spaced-apart shelves with a vertical clearance of 4-6" between the containers when  
25 they are mounted on the shelves. This allows good air circulation around the containers to promote rapid cooling. A fan circulates cooling air around the cooling room 16.

Containers of cooled pie filling mixture are delivered as  
30 required to a pie forming station 20.

A pie base dough is prepared by mixing (22) selected quantities of ingredient materials and adding a pre-set amount of scrap dough to the mixture. The quantity of

scrap dough added to the mixture is preferably in the range 8-12% by weight and most preferably 9-11% by weight. The scrap dough and other ingredient materials are mixed to form a base dough mixture. This base dough mixture is then passed through a former 24 to form the dough into a number of dough buns of a pre-set size. The dough buns are delivered to the pie forming station 20.

The pie forming station 20 is shown in Fig. 2 and has a central post 25 about which a carousel 26 travels stepwise. A number of shaped pie tray supports 27, which are shaped to receive and engage an underside of a pie tray, are spaced-apart around the carousel 26. A sleeve 28 is vertically slidable on the post 25 and carries a pie base former (not shown) and a pie cover press 29 on arms extending outwardly over the carousel 26 on opposite side of the sleeve 28. A pie filling station is formed by a reservoir 31 for pie filling mixture which is mounted adjacent the carousel and has a discharge pipe 32 with an outlet nozzle 33 positioned over the carousel 26 above the path travelled by the pie tray supports 27 and between the pie base former and the pie cover press 29. A plastics shroud 34 is mounted around the pie cover press 29.

At the pie forming station 20 each dough bun is deposited centrally in a pie tray. Each tray is then placed in a pie tray support 27 which is delivered beneath the pie base former. The pie base former is pressed into the dough to spread the dough in the pie tray such that it forms a pie base covering an inside-wall of the pie tray. The former is then raised and the pie tray advanced to beneath the pie filling mixture outlet nozzle 33 and a pre-selected quantity of a pie filling mixture 35 is deposited into the pie base.

Cover dough for the pies is prepared by mixing selected quantities of ingredient materials in a mixer 40. The dough is then rolled (41) by delivering the dough by means of a conveyor through a pair of rollers to progressively stretch the dough forming an elongate dough sheet. One end of the dough sheet is then folded inwardly over the dough sheet and then the other end of the dough sheet is folded inwardly over the first fold to form three substantially equal superimposed dough layers. The dough is then turned through 90° and then passed back and forth through the dough rollers again to progressively roll the dough again into a thin elongate dough sheet. These folding, turning and rolling operations are repeated twice more to form a layered dough sheet (having in this case twenty-seven layers) of a pre-desired thickness. In some cases further folding may be desirable - for example to produce eighty one layers. It will be noted also that in some cases some scrap cover dough may be laid on the elongate dough sheet prior to carrying out the final folding, turning and rolling operations.

The dough sheet is delivered through a cutting machine 42 which cuts the dough sheet into rectangular pie covers.

Downstream of the cutting machine 42 flour is dusted onto a top surface of each pie cover at a dusting station 43. A number of the pie covers are then stacked (44) and a spike coated with flour is driven centrally through the stack of pie covers to perforate (45) each pie cover in the stack.

A bottom surface of each pie cover is then wetted (47) with warm water. This is carried out by placing each pie cover 48 (Fig. 2) on a damp sponge 49 located in a shallow bath 50 with a base of the sponge 49 sitting in warm water

within the bath 50 and a top surface of the sponge 49 extending above the water.

The wetted pie cover 48 is then placed over the filled pie base downstream of the pie filling station and the pie  
5 tray is delivered under the press 29. The press 29 has a head which is moved downwardly to engage and press the pie cover 48 against the pie base around a rim of the pie tray to form a raw meat pie mounted within a pie tray, the pie having a sealed pie casing enclosing the pie filling  
10 mixture.

Scrap dough is removed from around a periphery of the tray and collected for re-use in forming further base dough material as previously described.

Downstream of the press 29 a number of the raw meat pies  
15 are arranged on a cooking tray. The cooking tray is delivered to a spraying station 60 (Fig. 3). At the spraying station 60, a tray 61 of raw meat pies 62 is placed on a table 63 within an L-shaped enclosure wall. A spray gun 65 is then used to clean the covers of the  
20 pies to remove excess flour and pieces of scrap dough and to spray a top surface of each pie with a glazing liquid. The spray gun 65 is connected via flexible pipes 66, 67 with a pressurised air supply and with a reservoir of glazing liquid. The spray gun 65 has a trigger 69 which  
25 when partially drawn back delivers an air jet from an outlet nozzle 70 of the spray gun 65 and the spray gun 65 can be advanced over the tray 61 blowing away excess flour and scrap dough. When the gun 65 has advanced to the end of the tray 61, the trigger 69 is pulled fully back and  
30 this disconnects the air supply and connects the nozzle 70 to the glazing liquid supply. The spray gun 65 is drawn back over the tray 61 to coat an upper surface of each pie 62 with a thin layer of glazing liquid.

The pies may then be delivered to a packing station 80 for packaging the uncooked meat pies.

Alternatively, a number of the trays 61 may be stacked vertically spaced-apart on an associated trolley. The  
5 trolley is then delivered to an oven 72 and the meat pies are cooked for a pre-set time at a selected temperature.

When the pies are cooked the trolley is removed from the oven 72 and delivered to a cooling booth 90 (Fig. 5). The cooling booth 90 comprises a housing having a floor 91  
10 with upstanding side walls 92 and a rear wall extending between the side walls 92. At an upper end of the sidewalls 92 is a ceiling 93 having an opening 94 communicating with a chamber 95. The chamber 95 connects  
15 via an air extraction duct 96 with an air extraction fan for drawing ambient air through a front opening of the booth 90 and up through the opening 94, the chamber 95 and exhaust duct 96. A pair of trolleys 98 containing stacked  
20 trays 61 of cooked pies can be wheeled into the booth 90 through the front opening and by operation of the fan a cooling stream of ambient air is drawn through the booth 90 to quickly pre-cool the cooked pies. Advantageously, heat from the cooked pies is drawn away in the exhaust air  
25 stream. When the pies are cool they are delivered to a chiller 100 for further cooling the pies to approximately 4°C.

The fully cooled pies may be packed or alternatively the pies may be frozen in a freezer 102 and then packed.

The invention is not limited to the embodiments hereinbefore described, which may be varied in both  
30 construction and detail.

**CLAIMS:**

1. A process for producing meat pies comprising the steps:

5 cutting up raw meat and dicing the raw meat to form meat pieces of a pre-desired size;

delivering the diced meat pieces to a cooking vessel together with other ingredient materials;

10 mixing the ingredient materials to form a pie filling mixture and cooking the pie filling mixture for a pre-set period;

pouring the cooked filling mixture into a number of containers and closing the containers;

rapidly cooling the pie filling mixture within each container to a pre-set desirable temperature;

15 delivering cooled pie filling material to a pie filling station;

preparing a pie base dough by mixing selected quantities of ingredient materials and adding a pre-set amount of scrap dough to the mixture;

20 forming the base dough into dough buns of a pre-desired size;

depositing each dough bun in a pie tray;

25 placing each pie tray on an associated support shaped to receive and engage an underside of the pie tray;



pressing an associated former into the dough to spread the dough in the pie tray such that it forms a pie base covering an inside wall of the pie tray;

5 removing the former and conveying the pie tray to the pie filling station;

depositing a measured quantity of pie filling material into the pie base at the pie filling station;

10 preparing a cover dough by mixing selected quantities of ingredient materials;

rolling the dough and folding the dough over on itself a pre-set number of times between rolling operations to form a layered dough sheet of a predesired thickness;

15 cutting the dough sheet into shaped pie covers;

dusting a top surface of each pie cover with flour;

perforating each pie cover;

20 wetting a bottom surface of each pie cover with warm water;

placing the pie cover over the filled pie base downstream of the pie filling station;

25 pressing the pie cover against the pie base around a rim of the pie tray to form an uncooked meat pie

having a sealed pie casing enclosing the pie filling, mounted within a pie tray;

mounting a number of the uncooked meat pies on a tray;

5           cleaning the covers of the pies with an air jet to remove excess flour and pieces of scrap dough; and

spraying a top surface of the pie cover with a glazing liquid.

10       2.       A process as claimed in Claim 1 wherein the pie filling mixture is poured from an outlet of the cooking vessel into the containers by partially filling each container with pie filling mixture and then pouring more filling mixture into each  
15           container to fill each container.

          3.       A process as claimed in Claim 1 or Claim 2 wherein the dough sheet for the pie covers is prepared by:  
  
          passing the dough through dough rollers a number of times for progressively rolling the dough into  
20           a thin elongate sheet;

          folding one end of the dough sheet inwardly over the dough sheet and then folding the other end of the dough sheet inwardly over the first fold to form three superimposed dough layers;

25           turning the dough through 90° and passing the dough through the dough rollers to progressively roll the dough into a thin elongate sheet;

repeating the folding, turning and rolling operations twice more to form the layered dough sheet.

- 5           4.       A process as claimed in any preceding claim wherein the scrap dough is added to the pie base dough mixture in an amount of between 8% and 12% by weight.
- 10           5.       A process as claimed in any preceding claim wherein the pie covers are perforated by stacking a number of the pie covers and then driving a spike centrally through the stack of pie covers.
- 15           6.       A process as claimed in any preceding claim wherein a bottom surface of each pie cover is wetted by placing a pie cover on a damp sponge, the sponge sitting in a warm water bath with a base of the sponge sitting in warm water and a top surface of the sponge projecting above the water.
- 20           7.       A process as claimed in any preceding claim including the further steps:  
  
                  stacking a number of trays of glazed uncooked meat pies spaced-apart on associated trolleys;  
  
                  delivering each trolley to an oven and cooking the meat pies for a pre-set time at  
25                a selected temperature;  
  
                  removing the trolleys from the oven;  
  
                  delivering each trolley into a cooling booth having a housing open at one side for

5 reception of the trolleys, the booth having an associated extractor fan mounted externally of the booth to draw ambient air in through the opening and through the booth and out through an air outlet of the booth spaced apart from the opening to cool the pies to a pre-desired temperature;

removing the pies from the cooling booth and delivering the pies to a chiller;

10 cooling the pies in the chiller to approximately 1 to 3°C.

8. A process as claimed in any preceding claim wherein the pie trays are colour coded to correspond to the type of filling in each pie.

15 9. A process for producing meat pies substantially as hereinbefore described with reference to the accompanying drawings.

10. Meat pies whenever produced by the process as claimed in any preceding claim.

Patents Act 1977  
 Examiner's report to the Comptroller under Section 17  
 (The Search report)

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Application number  
 GB GB 9322031.7

Relevant Technical Fields

(i) UK Cl (Ed.L/M) A2B: BMP1; BMP5; BMM19; BMM39;  
 BKW; A2A:A2

(ii) Int Cl (Ed.5) A23P; A23L; A21D

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) NONE

Search Examiner  
 B J GARDNER

Date of completion of Search  
 6 JANUARY 1994

Documents considered relevant  
 following a search in respect of  
 Claims :-  
 1 to 10

Categories of documents

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|---|--|
| <p>X: Document indicating lack of novelty or of inventive step.</p> <p>Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.</p> <p>A: Document indicating technological background and/or state of the art.</p> | <p>P: Document published on or after the declared priority date but before the filing date of the present application.</p> <p>E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.</p> <p>&amp;: Member of the same patent family; corresponding document.</p> |
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	NONE	

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